

The smaller, frequently almost procumbent subspecies is primarily and sharply set off from the typical population by the critical calyx distinction. It further occupies a clear-cut southern geographical range. Interestingly there is considerable similarity in its calyx characters to those of *Gentiana Parryi* of the southern Rocky Mountains, suggesting that this latter species might be likewise a southern, but more complete segregate of *G. calycosa* subsp. *typica*.

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ARNICA IN ALASKA AND YUKON

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For some time the manuscript of a monograph of the genus *Arnica* has been completed, and is awaiting publication. During the course of the work the writer had been asked by Dr. Eric Hultén to contribute the account of *Arnica* for the "Flora of Alaska and Yukon," now appearing in parts. Because of the immediacy of the needs of Dr. Hultén, and because appearance of the "monograph" does not, in the near future, seem probable, the following new entities, new names, and new combinations, for the most part, are herewith extracted from that study. Only the principal synonymy is given for the new names and combinations. Sequences and numbering of entities is that employed in the treatment prepared for Hultén's "Flora."

1a. ARNICA ALPINA (L.) Olin subsp. *angustifolia* (Vahl) comb. nov. *A. angustifolia* Vahl, Fl. Dan. 3. 1816; *A. alpina* (L.) Olin var. *angustifolia* Fernald, Rhodora 36: 96. 1934.

1b. ARNICA ALPINA (L.) Olin subsp. *attenuata* (Greene) comb. nov. *A. attenuata* Greene, Pittonia 4: 170. 1900.

1c. ARNICA ALPINA (L.) Olin subsp. *tomentosa* (Macoun) comb. nov. *A. tomentosa* Macoun, Ottawa Nat. 13: 168. 1899; *A. tomentosa* Greene, Pittonia 4: 168. 1900; *A. pulchella* Fernald, Rhodora 27: 18. 1915.

2a. ARNICA LOUISEANA Farr subsp. *frigida* (Meyer) comb. nov. *A. frigida* Meyer ex Ilijin, Trav. Musc. Bot. Acad. Sc. U.S.S.R. 19: 112. 1926; *A. nutans* Rydb. N. Am. Fl. 34: 328. 1927; *A. Sancti-Laurenti* Rydb., N. Am. Fl. 34: 328. 1927.

a. Var. *genuina* nom. nov. *A. frigida* Meyer ex Ilijin *l.c.*

b. Var. *Mendenhallii* (Rydb.) comb. nov. *A. Mendenhallii* Rydb. N. Am. Fl. 34: 329. 1927.

c. Var. *brevifolia* (Rydb.) comb. nov. *A. brevifolia* Rydb. N. Am. Fl. 34: 329. 1927.

d. Var. *illiamnae* (Rydb.) comb. nov. *A. Illiamnae* Rydb. N. Am. Fl. 34: 331. 1927.

e. Var. *pilosa* var. nov. Caulibus 5–10 (15) cm. altis, foliis 2.0–4.0 (5.0) cm. longis, denticulatis; herbaceo exigue piloso; pedunculis dense pilosis; pericliniis densus subflavis lanato-pilosis; capitulis nutantibus, aut plus frequenter erectis; acheniis glabratibus, aut plus frequenter sparse super hirsutis.

Type. Igloo Creek, McKinley National Park, July 11, 1932, *Joseph Dixon 29*. Deposited in the Herbarium of the University of California; isotype at the United States National Herbarium.

This population, seemingly confined to the Mount McKinley area, is strongly marked. Plants with erect heads closely resemble specimens of *A. alpina* subsp. *tomentosa*, to which indeed they had mostly been referred. The basally or entirely glabrous achenes, and the yellowish periclinial pubescence seem, however, definitely to relate the McKinley plants to *A. louiseana*.

4a. ARNICA CORDIFOLIA Hook. subsp. *genuina* nom. nov. *A. cordifolia* Hook., Fl. Bor. Am. 1: 33. 1834.

a. Var. *pumila* (Rydb.) comb. nov. *A. pumila* Rydb. Mem. N. Y. Bot. Gard. 1: 433. 1900.

5a. ARNICA CHAMISSONIS Less. subsp. *genuina* nom. nov. *A. Chamissonis* Less., Linnaea 6: 238. 1831.

a. Var. *typica* Regel, Suppl. Ind. Sachal 151. 1864.

b. Var. *interior* var. nov. Foliis inferioribus plus petiolatis, 2.5–3.5 cm. latis; capitulis 15–18 mm. latis; corollis disci 7–8 (10) mm. longis.

Type. Palliser, July 30, 1906, *S. Brown 770*. Type deposited in the Gray Herbarium; isotypes at United States National Herbarium, New York Botanical Garden, Academy of Natural Sciences, Philadelphia, Missouri Botanical Garden.

The variety *interior* is the common inland form, and by far the greatest population, extending southward into Canada. It differs from, although completely intergrading with, the maritime var. *typica* Regel in having mostly petiolate rather than sessile lower cauline leaves, smaller heads (18–20 cm. broad in var. *typica*), and shorter disc flowers (9–11 mm. long in var. *typica*).

6a. ARNICA AMPLEXIFOLIA Rydb. subsp. *genuina* nom. nov. *A. amplexifolia* Rydb. Mem. N. Y. Bot. Gard. 1: 434. 1900; *A. amplexicaulis* Nutt. Trans. Am. Phil. Soc. n.s. 7: 408. 1841, non Wall. 1837.

a. Var. *borealis* (Rydb.) comb. nov. *A. borealis* Rydb. N. Am. Fl. 34: 351. 1927.

6b. ARNICA AMPLEXIFOLIA Rydb. subsp. *prima* subsp. nov. Rhizomate longo, 2–3 mm. diametro, sparse radicellis vestito; caule 4.0–7.5 dm. alto, simplici, gracili, non furcato; foliis caulinis 5–7 jugis, elliptico-lanceolatis remote serrato-dentatis, 2–3 cm. latis, 6–8 cm. longis, capitulis 1–3, hemispherico-campanulatis, 12–15 mm. altis, pericliniis moderatis pilosis, longi stipitato-glandulosis.

Type. Kodiak, August 28, 1867, *A. Kellogg 231*. Deposited at the Academy of Natural Sciences, Philadelphia; isotypes at Gray Herbarium, United States National Herbarium, Missouri Botanical Garden, and a specimen of questionable authenticity at the New York Botanical Garden. The subspecies occurs only in maritime Alaska and on the Alaskan islands.

This subspecies may be separated from subsp. *genuina* by the following key:

- Cauline leaves 5-7 pairs, the lower 2 or 3 pairs petioled, margins only inconspicuously dentate-serrate; mostly with 1-3 heads; plants of the Alaskan Coast region and islands . . . *A. amplexifolia*
subsp. *prima*
- Cauline leaves 5-12 pairs, mostly all sessile, margins mostly conspicuously sharply serrate-dentate; mostly with 5(3)-7(9) heads; occurring from Alaska to California and Montana *A. amplexifolia*
subsp. *genuina*

This clearly distinct race is interesting and important. It shows much similarity to *Arnica Chamissonis* and *A. amplexifolia* subsp. *genuina*, in leaf character and pubescence, and particularly resembles the former in the tendency to produce long unappendaged rhizomes. Indeed the intermediate characters of this rather small group of plants strongly suggest the possible derivation of the remainder of the subgenus *Chamissonis* through *A. Chamissonis*. Or, again, this entity of primarily insular distribution might prove to be hybrid between *A. amplexifolia* and *A. Chamissonis*.

8a. ARNICA LESSINGII Greene subsp. *genuina* nom. nov. *A. Lessingii* Greene, Pittonia 4: 167. 1900.

8b. ARNICA LESSINGII Greene subsp. *Norbergii* Hultén and Maguire. Caulibus 2.5-3.5 dm. altis, foliis caulinis 5-6 jugis, (3) 5-8 cm. longis, 1-1.5 cm. latis, ellipticis, acutis, herbacio sparse aut moderate moniliformo-pilosis.

Type. Orca, August 14, 1937, *I. L. Norberg*. Deposited at Lund; isotype at Utah State College.

So striking and distinctive are the type specimens in height and in the numerous pairs of narrower cauline leaves (3-4 pairs in subsp. *genuina*) that the authors venture to designate them as a subspecies. Were it not for approaching intermediates (*Hultén 8144* from Juneau) they should be tempted to propose these plants as representing a separate species. A somewhat similar plant, *Anderson 2A 375* from Mendenhall, is questionably referred here. It may be found that the Norberg specimens represent sole disparities and hence are best relegated to varietal rank.

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